Wisconsin Behavioral Risk Factor Survey Brief: Health-Related Quality of Life

Using the Behavioral Risk Factor Survey to Examine How Wisconsin Adults View Their Health[1]

Population health research increasingly examines factors beyond the purely biomedical to help explain patterns of health and health disparities. Evidence that physical health is related to socioeconomic factors and the differential life experiences they produce now prompts epidemiological researchers and social scientists alike to investigate the ways in which characteristics such as income, education and race are associated with the health of population subgroups (Idler and Kasl, 1994).

At the same time, there is increasing awareness among health researchers of the value of self-reported information. Subjective assessments (self-reports) of health status, once assumed to be unreliable and therefore lacking in utility, are now commonly included in population health surveys, as evidence accumulates that they mirror objective health status with a high degree of accuracy and provide useful adjunct information about the health of populations (Beatty, Schechter and Whitaker, 1996). Subjective assessments of health are thus likely to vary by socioeconomic and other characteristics, much as objective health measures do.

Questions tapping subjective assessments of health status and a related concept, health-related quality of life (HRQOL), are now included in the National Health and Nutrition Examination Survey (NHANES) and have appeared in the Centers for Disease Control and Prevention's (CDC's) Behavioral Risk Factor Survey (BRFS) since 1993.

What is Health-Related Quality of Life?

A key element of the concept of health-related quality of life is *self*-perception rather than observation or measurement by another person. Health-related quality of life includes

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self-perceptions of health and levels of physical, mental and social functioning in daily life (CDC, 1995). This suggests that measures of HRQOL are a potentially useful tool in assessing progress toward goals such as those associated with federal and state health plans, and the federal *Healthy People 2010* reference publication (USDHHS, 2000) includes a discussion of health-related quality of life measures in relation to *Healthy People 2010 Goal 1*: Increase quality and years of healthy life. Success in attaining *Healthy People 2010* objectives should, over time, be reflected in decreasing disparities in health-related quality of life among key population subgroups. Assessment of health-related quality of life thus has clear relevance for Wisconsin's state health plan, *Healthiest Wisconsin 2010,* and, more generally, provides a useful counterpart to population-level measures of chronic disease prevalence and health-risking behaviors.

This report uses Wisconsin BRFS data to provide a snapshot of the health-related quality of life of the state's adult population and identifies differences in HRQOL measures by key health and socioeconomic characteristics. With its publication, Wisconsin joins the growing number of state BRFS programs that are producing, or have already produced, reports and papers on the health-related quality of life of their populations.

Behavioral Risk Factor Survey (BRFS)

The BRFS is a representative telephone survey of adults 18 and older conducted throughout each calendar year in all 54 states and territories, in conjunction with the Behavioral Surveillance Branch of the CDC. The CDC uses national BRFS data to estimate the prevalence of health risk behaviors such as smoking, binge drinking and physical exercise; prevalence of chronic diseases such as diabetes and asthma; and receipt of recommended cancer screening tests.

The Wisconsin BRFS uses a stratified sampling design and includes an annual over-sample of African Americans in the Milwaukee area. Weighted BRFS data are representative of the non-institutionalized Wisconsin adult population living in households with land-line telephones. This report uses Wisconsin BRFS data from 2004 and earlier years as necessary to achieve a sufficient number of cases for subgroup analysis.

BRFS Health-Related Quality of Life Core Questions

The BRFS Health-Related Quality-of-Life measures are intended to broadly estimate population health and the burden of poor health. The BRFS core quality-of-life module contains four questions the CDC has included in the survey in most years since 1994:

1. Would you say that **in general** your health is excellent, very good, good, fair or poor?

2. Now thinking about your **physical health**, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

3. Now thinking about your **mental health**, which includes stress, depression and problems with emotions, for how many days during the past 30 days was your mental health not good?

4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your **usual activities**, such as self-care, work or recreation?

Validity of the BRFS quality-of-life measures has been established through evidence of correlation with another widely accepted measure of functional status, the SF-36 (*Medical Outcomes Short Form 36*; J.E. Ware, developer), and through correlations with actual morbidity and mortality, especially of chronic diseases (Newschaffer, 1998).

Health-Related Quality of Life Measures and Wisconsin Results

Unhealthy Days is defined as the number of days – in the past 30 days – when either mental health or physical health was not good. *Unhealthy Days* is the CDC's summary measure of health-related quality of life, calculated by adding the number of bad physical health days to the number of bad mental health days, with a logical maximum of 30 days.

Early testing of the BRFS quality-of-life module indicated that most survey respondents report substantially different numbers of physically unhealthy versus mentally unhealthy days (less than 5% report equal numbers of both). This suggests that overlap between the two areas should be minimal and adding them to produce a summary measure of unhealthy days is reasonable.

Figures 1 and 2 compare the average number of unhealthy days among people with various socioeconomic characteristics and health conditions to the average number of unhealthy days for the state's adult population as a whole. Where 95% confidence intervals, indicated by horizontal bars, do not overlap, differences between categories are statistically significant. Confidence interval width indicates the precision of an estimate and is influenced in part by the number of cases under consideration. Larger numbers of cases produce narrower confidence intervals, and vice versa. The overall average for Wisconsin adults -- approximately 6 days -- is included in Figures 1 and 2 as a benchmark for comparison.

As Figure 1 indicates, chronic diseases such as diabetes, arthritis, asthma, as well as physical inactivity, current smoking and obesity are associated with significantly greater-than-average numbers of unhealthy days. Wisconsin adults with limited income or less than a high school education also have greater-than-average numbers of unhealthy days. Conversely, having an annual household income greater than $35,000 and being physically active are both associated

with smaller-than-average numbers of unhealthy days. Having a college degree is associated with fewer-than-average unhealthy days but the difference is not statistically significant. However, the differences in unhealthy days between those with higher versus lower income, and between those with higher versus lower education, are statistically significant. Figure 2 indicates a statistically significant difference between African Americans and whites in the average number of unhealthy days.

Figure 1. Average number of unhealthy days in the past 30 days by selected characteristics, 2004

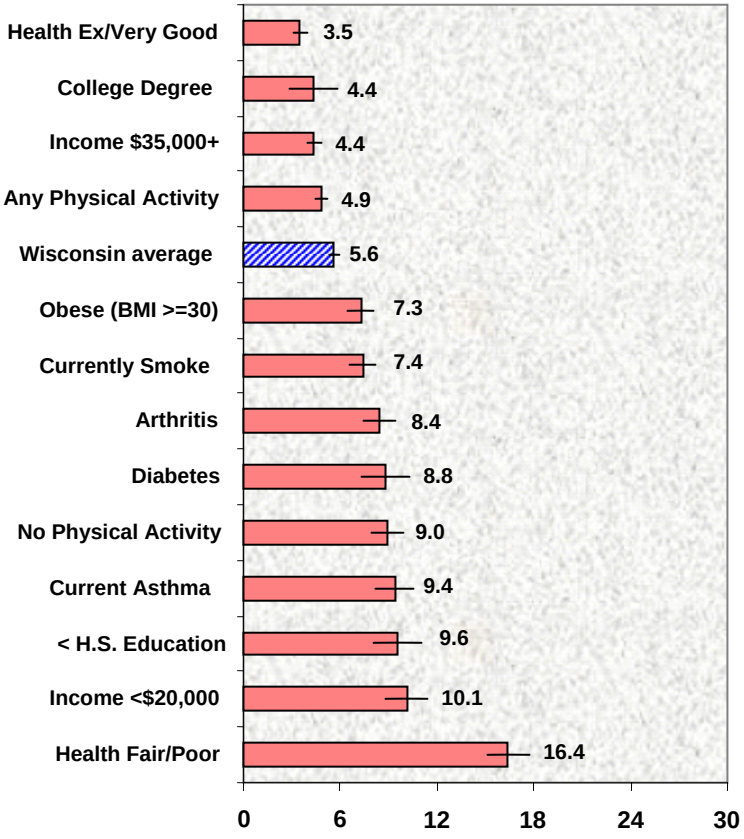

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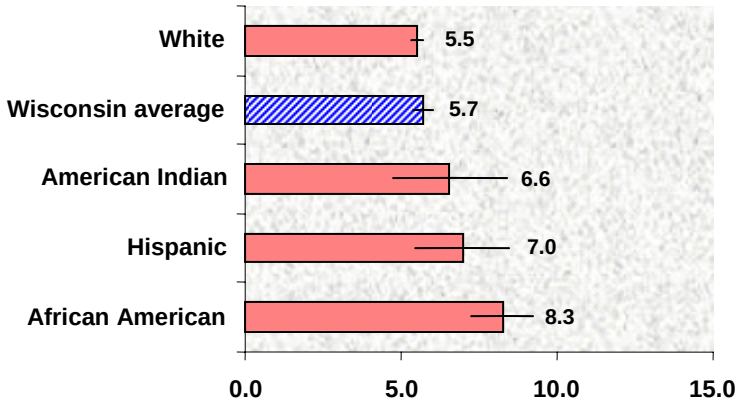
Figure 2. Average number of unhealthy days in the past 30 days by race/ethnicity, Wisconsin adults: 2001/ 2003-2004



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Frequent Mental Distress is defined as self-reported mental health "not good" on 14 or more of the previous 30 days.

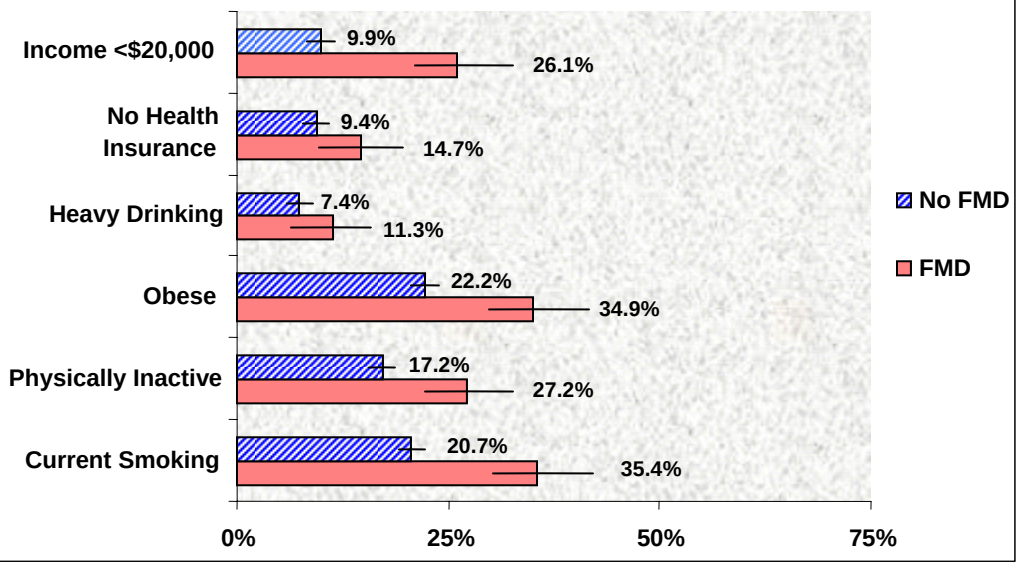
Mental illness and various forms of mental distress impose a substantial burden on individual health and the health care and social services delivery systems, as well as reducing workforce productivity. While information about the overall prevalence of mental distress within populations is limited, estimates suggest that up to 24 percent of U.S. adults experience some form of mental health problem in a given year (CDC, 1998). The BRFS health-related quality-of-life module addresses frequent mental distress (FMD) as a key indictor of health and defines it as self-reported poor mental health on at least 14 of the previous 30 days.

The 14-day threshold is consistent with the time-span used by clinicians in assessing depression and anxiety. It should be kept in mind, though, that the BRFS "mental health days" question is not a diagnostic tool and is best viewed as a broad-brush indicator of the burden imposed by the whole spectrum of mental health symptoms within a population. That said, the overall prevalence of frequent mental distress in Wisconsin, and the burden imposed by it, is likely to be underestimated in these data due to limitations of BRFS sampling coverage. BRFS excludes people living in households without telephones, people living in group quarters and shelters, and the homeless. Adults in the latter two living situations in particular are more likely to be affected by mental health issues than the general population (CDC/MMWR, 1998).

Nationally, BRFS data indicate that frequent mental distress is associated with increased risks to physical health and general well-being, including a greater prevalence of smoking, heavy

drinking, physical inactivity, obesity and lack of health insurance among respondents who report it (Strine et al., 2004). Differences by FMD status on these characteristics are present among Wisconsin residents as well. For example, as Figure 3 shows, approximately 35% of those who report FMD are current smokers, compared with 21% of those not reporting FMD. Again, where the 95% confidence intervals do not overlap, the differences are assumed to be statistically significant.

Figure 3. Percent with selected health risks: Comparison of Wisconsin adults with Frequent Mental Distress (FMD) and those without FMD Wisconsin adults, 2004



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Overall, approximately 8% of Wisconsin adults experience frequent mental distress[2]. Examination, in Figure 4, of the proportion with various health and socioeconomic characteristics who also report frequent mental distress suggests a number of factors that may be associated with a higher or lower prevalence of it.

Patterns in Figure 4 show similarities to those in Figure 1 with respect to the *Unhealthy Days* measure. Higher education and household income are both associated with a lower prevalence of FMD relative to the overall Wisconsin proportion of 8% and a lower prevalence of FMD relative to those with low education and income (approximately 6% versus 15% for education and approximately 6% versus 20% for income).

[2] The average number of bad mental health days reported by those with frequent mental distress is 22.9 – considerably more than the threshold of 14 days.

Physical inactivity, obesity, current asthma and arthritis are also associated with a significantly higher prevalence of FMD relative to the overall state proportion. Finally, the relationship between smoking and FMD is further illustrated. As noted, Figure 3 suggests that those with FMD are more likely to smoke than those without FMD; here Figure 4 indicates that a larger proportion of smokers (13%) report having FMD compared to the overall population (8%).

The suggested relationship in Figure 4 between arthritis and frequent mental distress is consistent with national BRFS findings showing a link between the two conditions, particularly among older adults (Strine et al., 2004). In general, depression is associated with chronic pain and chronic illness, including arthritis (Bazargan and Hamm-Baugh, 1995), and the results shown here for Wisconsin adults appear to bear that out.

Figure 4. Percent of Wisconsin adults with Frequent Mental Distress by selected characteristics, 2004

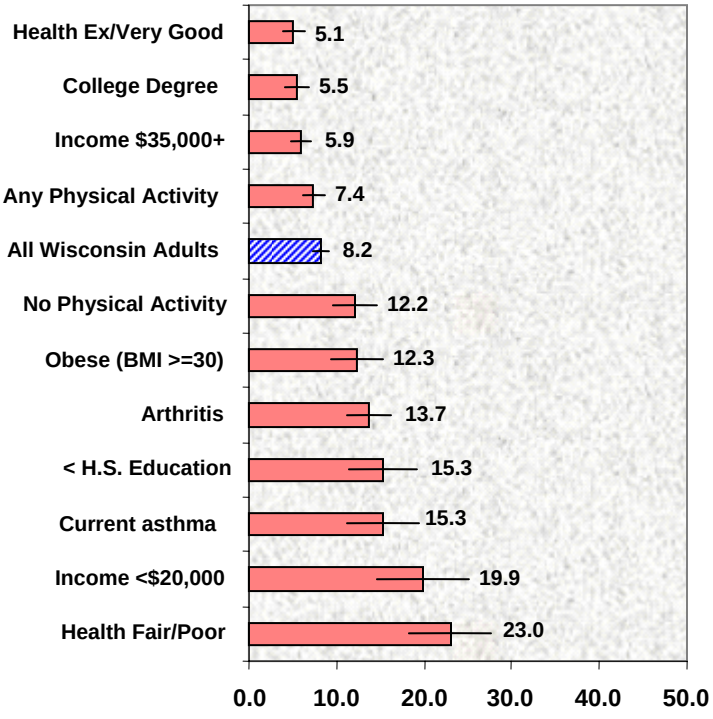

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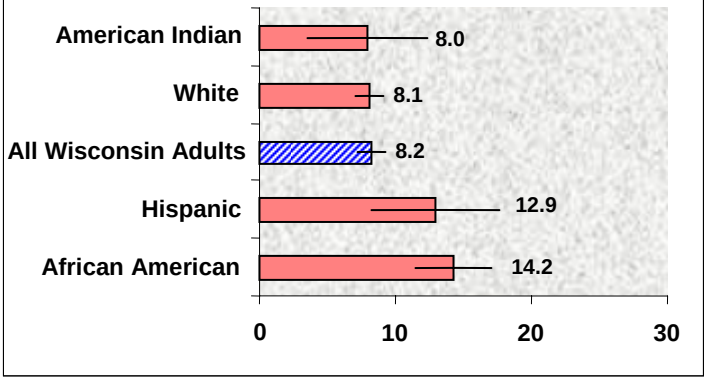
Figure 5 indicates that – again like *Unhealthy Days* – differences by race/ethnicity are apparent in self-reported frequent mental distress. In contrast with whites, a larger percentage of African Americans and Hispanics report frequent mental distress (14.2% of African Americans

and 12.9% of Hispanics versus 8.1% of whites). The difference between African Americans and whites is statistically significant.

Figure 5. Percent of Wisconsin adults with Frequent Mental Distress by race/ethnicity 2001, 2003-2004



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The general similarity of the distribution patterns for two HRQOL measures – *Unhealthy Days* and *Frequent Mental Distress* – suggests that self-perceived health among Wisconsin residents varies in ways that mirror objectively documented differences in health status by social and economic characteristics, risk behaviors and chronic health conditions. This is particularly the case with respect to income and education, race/ethnicity, smoking and arthritis status.

Activity Limitation Days is defined as the number of days in the past 30 days when poor physical or mental health prevented usual activities.

Unhealthy Days measures (Figure 1) the number of self-perceived bad mental or physical health days irrespective of their actual impact on daily life activities. In contrast, *Activity Limitation Days* specifically addresses the number of days when poor health limited usual activities. The BRFS question refers to limitation of any usual activities, including self-care, work and recreation, and is asked of respondents who report at least one bad health day in the past 30 days.

Figure 6 shows the average number of activity limitation days by selected social and health characteristics. Several characteristics and conditions are associated with a greater-than-average number of activity limitation days, including arthritis, physical inactivity and frequent mental distress. These differences (from average) are all statistically significant. In addition, Figure 6 indicates a potential relationship between activity limitation and age. While Figure 1

indicates that older adults do not have significantly more bad health days than younger adults, Figure 6 suggests that bad health days are more serious for those over 65, resulting more frequently in activity limitation.

The familiar pattern with respect to socioeconomic characteristics is also evident. Higher income and education are associated with fewer activity limitation days; lower income and education are associated with more activity limitation days. African Americans report significantly more activity limitation days as a result of poor health than whites (Figure 7).

Figure 6. Average number of days poor health prevented usual activities in the past 30 days by selected health characteristics, 2004

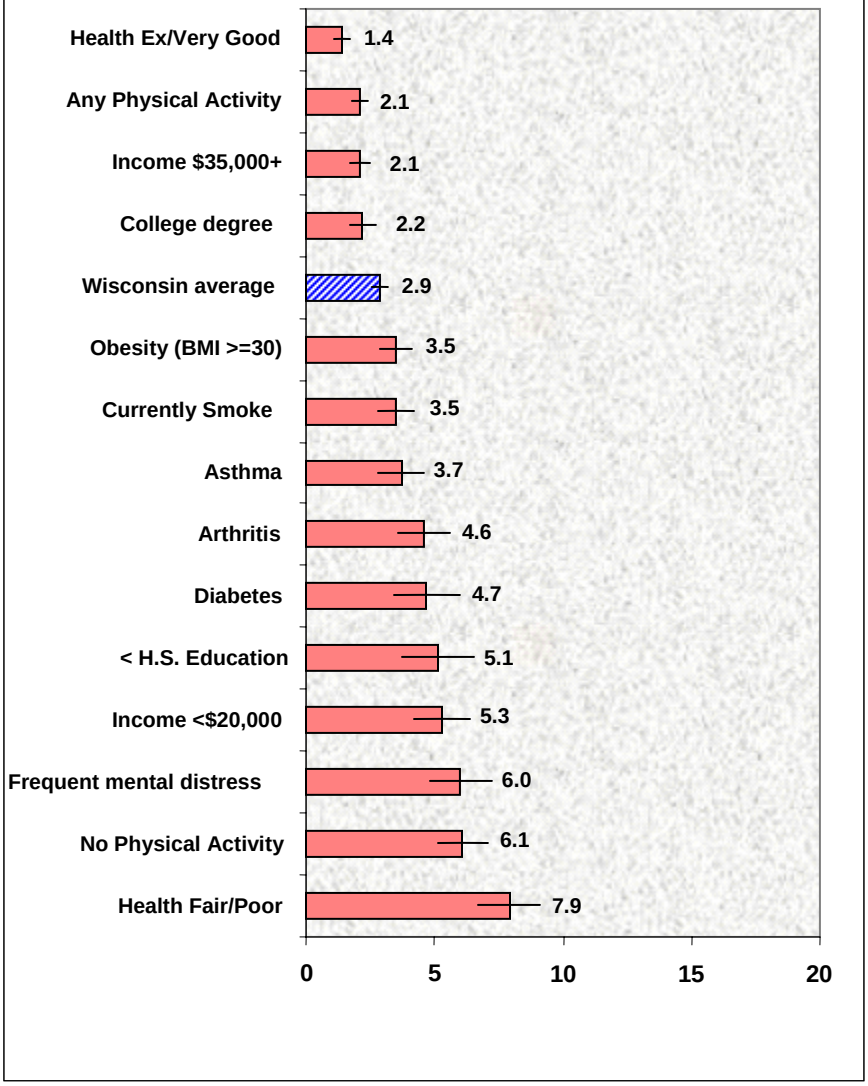

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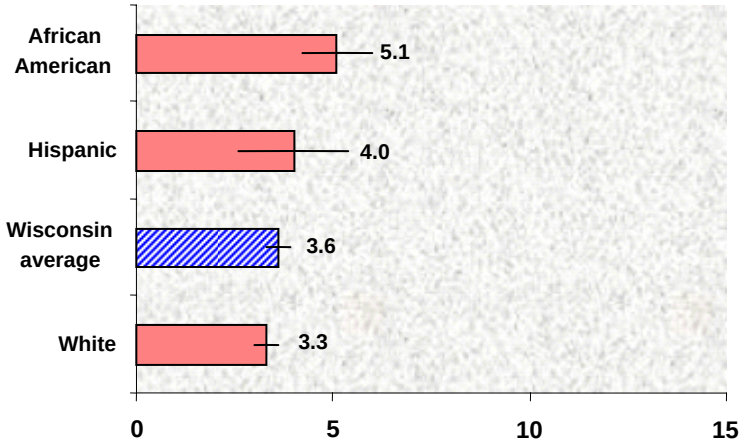
Figure 7. Average number of days poor health limited usual activities in the past 30 days by race/ethnicity 2001, 2003-2004



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Self-Rated General Health: Respondents are asked to rate their general health as excellent, very good, good, fair or poor.

Self-rated overall health status is associated with objective physical and mental health status and is predictive of subsequent mortality in follow-up studies (Hennessy et al., 1994). It is the most frequently used measure of subjective health status included in health surveys.

Figure 8 shows the proportion of Wisconsin adults with fair or poor health in selected health and socioeconomic categories. As with the other health-related quality-of-life measures, there is evidence of association with income and education. Compared to the state's adult population as a whole -- and to those with higher education and income -- a significantly larger proportion of Wisconsin residents with low education (less than high school) and/or low income (less than $20,000 per year) report having only fair or poor health. As with the other health-related quality of life measures, Figure 9 indicates that a significantly larger percent of African Americans than whites report having fair or poor health.

Obesity, asthma, age greater than 65, arthritis and diabetes are also associated with fair or poor self-reported health, as shown in Figure 8. Across all of these characteristics, the proportion with fair or poor health is significantly greater than among the state's adult population as a whole. In particular, Figure 8 suggests profound negative health effects associated with the presence of diabetes.

Figure 8. Percent of Wisconsin adults with fair or poor health by selected socioeconomic and health characteristics, 2004

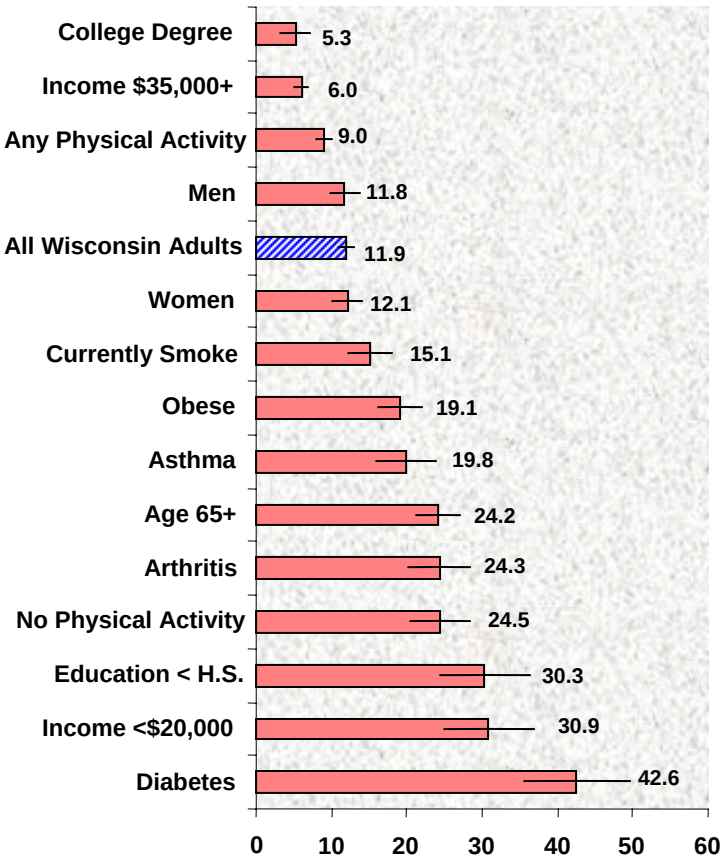

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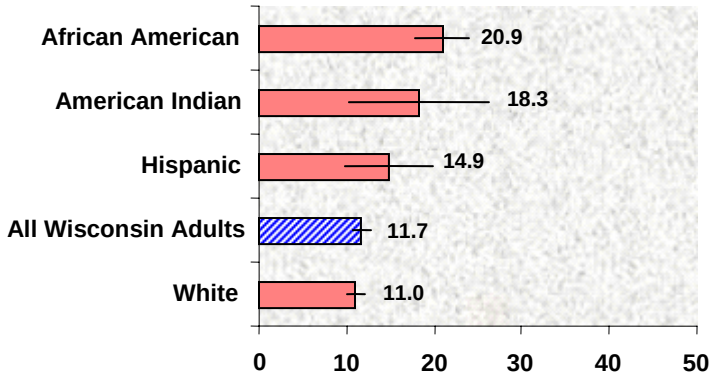
Figure 9. Percent of Wisconsin adults with fair or poor health by race/ethnicity, 2001, 2003-2004



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Summary

Patterns in the health-related quality of life of Wisconsin adults shown in this report generally support what is known through direct, objective measurement about differences in health by demographic subgroups and other characteristics.

First, patterns indicating health disparities by socioeconomic characteristics are evident: higher income and education appear to confer clear benefits in terms of health-related quality of life. Across all measures, these characteristics are associated with better overall health and fewer bad physical and mental health days per month. Similarly, race/ethnicity appears to be associated with differences in self-rated health and average number of bad health days, with whites reporting significantly fewer bad health days than African Americans. In part, these disparities are related to well-known differences in access to material resources, but the full explanation for differences in health by social characteristics, including race/ethnicity, is not yet known and remains the subject of ongoing research.

Second, the results suggest that behavioral health risks such as physical inactivity, smoking and obesity are associated with reduced health-related quality of life. Smoking, in particular, appears strongly linked with frequent mental distress. Finally, chronic health conditions such as arthritis, asthma, diabetes appear to be associated with lower health-related quality of life among Wisconsin adults, particularly where activity limitation is present. Additional data and analyses are needed to fully explain these relationships.

Limitations

Data presented here are to be interpreted with caution in keeping with the sizes of confidence intervals provided and the limitations associated with bivariate analysis. Confidence intervals show the amount of imprecision associated with the point estimates – the wider the interval, the less precise the estimate. The bivariate – or two-variable – relationships presented show association, not causation, and the relationships between certain population characteristics and health-related quality of life may be more complex than they appear from these data.

References

Bazargan, Mohsen and Verneda Hamm-Baugh. 1995. "The Relationship Between Chronic Illness and Depression in a Community of Urban Black Elderly Persons." Journal of Gerontology: Social Sciences. Volume 50B, Number 2: S119-S127.

Beatty, Paul, S. Schechter and K. Whitaker. 1996. "Evaluating Subjective Health Questions: Cognitive and Methodological Investigations." Proceedings of the Section on Survey Research Methods; 51st Annual Conference of the American Statistical Association: 956-961.

Hennessey, C., D. Moriarty, M. Zack, P. Scherr and R. Brackbill. 1994. "Measuring Health-Related Quality of Life for Public Health Surveillance." Public Health Reports. Volume 109, Number 5: 665-672.

Idler, Ellen and S, Kasl. 1995. "Self-Ratings of Health: Do They Also Predict Change in Functional Ability?" Journal of Gerontology: Social Sciences. Volume 50B, Number 6: S334-S353.

Centers for Disease Control and Prevention. Health-Related Quality-of-Life Measures -- United States, 1993. Morbidity and Mortality Weekly Report (MMWR) 1995; 44:195-200.

Centers for Disease Control and Prevention. Self-Reported Frequent Mental Distress Among Adults – United States, 1993-1996. MMWR 1998; 47:325-331.

Centers for Disease Control and Prevention. Measuring Healthy Days: Population Assessment of Health-Related Quality of Life. 2000.

Newschaffer, Craig. 1998. "Validation of Behavioral Risk Factor Surveillance System (BRFSS) HRQOL Measures in a Statewide Sample." (Final Report.) U.S. Centers for Disease Control and Prevention. Department of Health and Human Services.

Strine, Tara, D. Chapman, R. Kobau, L. Balluz and A. Mokdad. 2004. "Depression, Anxiety and Physical Impairments and Quality of life in the U.S. Noninstitutionalized Population." Psychiatric Services. Volume 55, Number 12: 1408-1413.

Strine, Tara D., J. Hootman, C. Okoro, L. Balluz, D. Moriarty, M. Owens and A. Mokdad. 2004. "Frequent Mental Distress Status Among Adults with Arthritis Age 45 Years and Older, 2001." Arthritis and Rheumatism (Arthritis Care and Research). Volume 51, Number 4: 533-537.

U.S. Department of Health and Human Services (USDHHS). 2000. Healthy People 2010, Vol. 1.

Wisconsin BRFS Sample Cases and Point Estimates for Figures 1-9

Characteristic	Number of Cases	Average Unhealthy Days Past 30 Days	Average Days Poor Health Limited Usual Activities Past 30 Days[3]	Percent with Frequent Mental Distress	Percent with Fair/Poor Health
Total, 2004	4,400	5.6	2.9 (n=2,481)	8.2	11.9
Ex/VG Health	2,458	3.5	1.4	5.1	----
College Degree	1,316	4.4	2.2	5.5	5.3
Income >$35,000	2,041	4.4	2.1	5.9	6.0
Physically Active	3,489	4.9	2.1	7.4	9.0
Obese	1,068	7.3	3.5	12.3	19.1
Currently Smoke	979	7.4	3.5	13.2	15.1
Arthritis	654	8.4	4.6	13.7	24.3
Diabetes	300	8.8	4.7		42.6
Physically Inactive	910	9.0	6.1	12.2	24.5
Current Asthma	570	9.4	3.7	15.3	19.8
< H.S. Education	345	9.6	5.1	15.3	30.3
Income <$20,000	540	10.1	5.3	19.9	30.9
Fair/Poor Health	599	16.4	7.9	23.0	----
FMD*	403	25.2	6.0	----	32.7
Women	2,644	6.2	3.1	9.3	12.1
Men	1,758	5.0	2.7	7.1	11.8
Total, 2001/ 2003-2004	11,902	5.7	3.6 (n=6,912)	8.6	11.7
African American	1,017	8.3	5.1	14.2	20.9
American Indian	144	6.6	7.1	8.0	18.3
Hispanic	486	7.0	4.0	12.9	14.9
White	9,903	5.5	3.3	8.1	11.0

*Frequent Mental Distress.

[3] The denominator includes those with any bad mental or physical health days. If number of bad mental health days and number of bad physical health days are both zero, number of days with activity limitation does not apply.